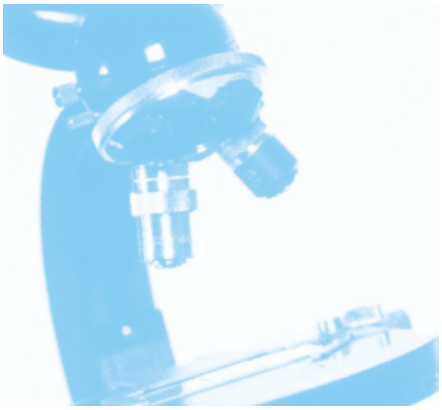

Toolbox

Dental emergencies

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Most oral emergencies relate to pain, bleeding, or orofacial trauma and should be attended by a dental practitioner. However, in the absence of access to dental care, a medical practitioner may be called on to help. Jaw fractures require the attention of oral or maxillofacial surgeons.

Summary points

- Emergency treatment of dental abscess is the administration of antimicrobial agents and analgesic medication and drainage of a fluctuant swelling by a dentist; without dental treatment, the abscess will recur
- Emergency care of postextraction bleeding is to have the patient bite on gauze for 15-30 minutes; if it persists, the socket may require packing with a hemostatic agent or suturing. It occasionally signifies an unrecognized bleeding tendency
- Pain increasing after an extraction may indicate infection or fracture, so radiographs should be obtained to exclude a pathologic condition
- Primary teeth should not be replanted, but permanent teeth in children can be successfully replanted; the tooth should be kept clean and moist in saline or milk solution, replanted as soon as possible, and splinted
- A priority in patients with maxillofacial injury is the airway
- Middle third facial fractures may be associated with cerebrospinal rhinorrhea, and zygomatic fractures may be associated with ocular damage; in any case, a maxillofacial team should be involved at an early stage for planning treatment

DENTAL PAIN

Pulpal pain is spontaneous, strong, often throbbing, exacerbated by temperature, and outlasts the evoking stimulus. Localization is poor, and pain tends to radiate to the ipsilateral ear, temple, or cheek. The pain may abate spontaneously, but the patient should still be referred for dental advice because the pulp has probably necrosed, and acute periapical periodontitis (dental abscess) will probably follow (figure 1). Endodontics (root canal treatment) or tooth extraction is required.

Periapical periodontitis pain is spontaneous, severe, persists for hours, is well localized, and is exacerbated by biting. The adjacent gum is often tender to palpation. An abscess may form (gumboil), sometimes with facial swelling, fever, and illness (figure 2). Fascial space infections are fortunately rare because they threaten the airway: patients should be referred to a specialist (see box). In the absence of immediate dental attention, it is best to incise a fluctuant abscess and to give antimicrobial agents (such as amoxicillin) and analgesic medication. The acute situation usually then resolves, but the abscess will recur because the necrotic pulp will become reinfected unless the tooth is endodontically treated or extracted. A chronic abscess, however, may be asymptomatic apart from a discharging sinus. Rarely, this may open on to the skin (figure 3).

Figure 1 Orofacial swelling in a patient with an acute dental abscess

BLEEDING

Most oral bleeding results from gingivitis (see Toolbox, *wjm* April 2001) or trauma, but if it is prolonged, the patient should have an evaluation for a bleeding tendency.

Trauma

After a tooth is extracted, the socket bleeds normally for a few minutes but then clots. Because clots are easily disturbed, patients should be advised not to rinse their mouth, disturb the clot, chew hard, take hot drinks or alcohol, or exercise for the next 24 hours. If the socket continues to bleed, a gauze pad should be laid across the socket and the patient bite on it for 15 to 30 minutes. If it continues to bleed, a hemostatic agent (such as Surgicel) should be placed in the socket. If the bleeding continues, the socket should be sutured and consideration given to a bleeding tendency.

Dental indications for urgent admission to hospital

Trauma

- Middle third facial fractures
- Mandibular fractures unless simple or undisplaced
- Zygomatic fractures where there is danger of ocular damage

Inflammatory lesions and infections

- Cervical or facial fascial space infection
- Oral infections in which patient's condition is "toxic" or severely immunocompromised
- Tuberculosis (some)
- Severe viral infections
- Severe vesiculobullous disorders (pemphigus, Stevens-Johnson syndrome, toxic epidermal necrolysis)

Blood loss

- Severe or persistent hemorrhage (particularly in a patient with a bleeding tendency)

Others

- Diabetes mellitus under poor control

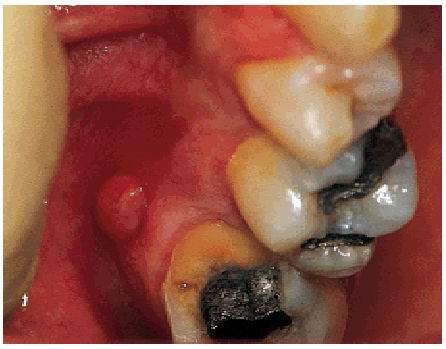

Figure 2 Chronic dental abscess at a typical site, in this case, related to the broken molar

SURGICAL COMPLICATIONS

Postextraction pain

Some pain and swelling after tooth extraction are common but ease after a few hours. Acetaminophen usually provides adequate analgesia. Pain from complex procedures may last longer and should be controlled with regularly administered analgesic agents. If pain persists or increases, the patient should return to the dentist to exclude a pathologic disorder (such as dry socket or jaw fracture).

Infection

Localized osteitis (dry socket) occasionally follows an extraction, typically a lower molar extraction. After 2 to 4 days, there is usually increasing pain, halitosis, unpleasant taste, an empty socket, and tenderness. The clinician should exclude retained roots, foreign body, jaw fracture, osteomyelitis, or other pathologic condition, especially if there is fever, intense pain, or neurologic signs such as labial anesthesia. The infection is treated by irrigation with warm (50°C) saline solution or aqueous chlorhexidine, after which the socket is dressed (several concoctions are available), and the patient given analgesic medication and an antimicrobial agent (metronidazole).

Figure 3 Dental sinus opening on to skin

Figure 4 Purplish swelling characteristic of actinomycosis

Actinomycosis is a rare late complication of extraction or jaw fracture and usually presents as a chronic purplish swelling (figure 4). A 3-week course of penicillin is often indicated.

Antral complications

If the patient has loss of a tooth or root into the antrum, an antimicrobial agent and a nasal decongestant are given and the object located by radiography. A further operation is required.

Patients in whom an oroantral fistula (figure 5) develops should be cautioned not to blow their nose. An antimicrobial agent and nasal decongestants are helpful. If a fistula is detected early, primary closure is possible, but others may need flap closure by a specialist.

FRACTURED TEETH

Injuries to the primary teeth may be of little consequence with regard to emergency care, but even seemingly mild injuries can damage the permanent successors. As many as 30% of children have damaged permanent teeth by the age of 15 years.

Enamel fracture of permanent teeth needs no emergency care, but dental attention should be sought later. More severe injuries affecting the dentine should be treated as urgent because there might be pulpal infection. Emergency care consists of placing a suitable dentine lining material onto the fractured dentine, so prompt treatment by a dentist within the same working day or at least by the following morning is required. Fractured roots require dental advice.

AVULSED TEETH

Avulsed permanent anterior teeth (figure 6) can be replanted successfully in a child, particularly if the root apex is not completely formed (children younger than 16 years). Avulsed primary teeth should not be replanted. The younger the child and the sooner the replantation, the better the success; teeth replanted within 15 minutes stand a 98% chance of being retained after further dental attention.

Figure 5 Oroantral fistula after extraction of an upper molar. The antral floor is often in close proximity to the roots of maxillary molars and premolars

Immediate replantation gives the best results. Hold the tooth by the crown (do not handle root as that could damage the periodontal ligament). If the tooth is contaminated, rinse it with a sterile saline solution, and if the socket contains a clot, remove it with saline irrigation. Replant the tooth the right way round (ensuring that the labial [convex] surface is facing forward) and manually compress the socket. Splint the tooth; "finger crimping" a foil milk bottle top is a temporary measure, and an alternative is tissue adhesive. The child should see a dentist within 72 hours.

If immediate replantation is not possible, the tooth should be placed in an isotonic fluid (cool fresh pasteurized or long-life milk, saline solution, or contact lens fluid). Other-

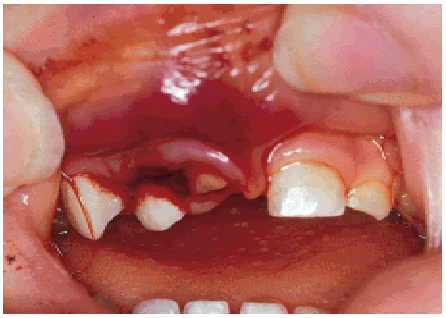

Figure 6 Oral and dental trauma after a skateboarding accident

wise, if the child is cooperative, the tooth should be placed in the buccal sulcus and dental care obtained within 30 minutes. Unsuitable and slightly damaging fluids are water (because of isotonic damage as a result of prolonged exposure), disinfectants, bleach, and fruit juice. The use of a doxycycline immersion before reimplantation by the dentist may be helpful in preventing later external root resorption.

The tooth should be splinted for 7 to 10 days, with no biting on splinted teeth, soft diet, and good oral hygiene.

During follow-up, the patient should be examined for root resorption, ankylosis, and tooth submergence (infraocclusion), which are possible complications.

MAXILLOFACIAL TRAUMA

Dislocation or subluxation of mandible

Dislocation or subluxation of the mandible is commonly caused by a blow to the chin when the jaw is open. The condyles are dislocated forward and upward anterior to the eminence, and the patient gags open.

Fractures must be excluded (see box). Reduction can usually be achieved by facing the patient, placing the thumb pads over the lower molars, and applying downward pressure while, with the fingers under the chin, rotating the jaw backward and upward. If muscle spasm prevents reduction, intravenous administration of midazolam hydrochloride may be needed. After reduction, the patient should avoid wide opening of the jaw.

Recurrent dislocation is a feature of Ehlers-Danlos and Marfan's syndromes.

Jaw fractures

Jaw fractures result mainly from high-velocity impact as in motor-vehicle accidents, other accidents, and assaults. The immediate concern is to preserve the airway. All traumatized patients should be assessed according to the advanced trauma life support protocol. Other immediate life-threatening problems include intracranial hemorrhage, severe hemorrhage from other sites, and cervical spine damage. During the secondary survey, the head is inspected for lacerations and leakage of cerebrospinal fluid.

Radiographs for demonstrating maxillofacial fractures

Mandibular fracture
- Panoramic *or*
- Bilateral oblique laterals
- Posteroanterior view of mandible
- Occlusal

Temporomandibular joint and condyle fracture
- Conventional and high orthopantomogram *or*
- Towne projection
- Consider computed tomography

Zygomatic arch fracture
- Occipitomental
- Submentovertex (exposed for zygomatic arches, not base of skull)

Middle third fracture
- Occipitomental at 30 degrees
- Occipitomental at 10 degrees
- Lateral skull
- Computed tomography

Skull fracture
- Posteroanterior view of skull
- Lateral skull (brow up)
- Submentovertex (exposed for base of skull)
- Computed tomography

Nasal fracture
- Soft tissues lateral view for nasal bones
- Occipitomental at 30 degrees

Associated bleeding may further compromise the airway. Jaw fractures alone, unless associated with a split palate or gunshot wounds, rarely cause severe hemorrhage. Bleeding from a ruptured inferior dental artery usually stops spontaneously but may recur if, for example, there is traction on the mandible. Severe maxillofacial bleeding may be tamponaded with craniofacial fixation. Bleeding can arise from fractured nasal bones, in which case nasal packing may be required. If bleeding recurs, the damaged vessel must be ligated.

Definitive management of fractures, despite frighteningly severe disfigurement, is not an immediate priority, but debris such as fractured teeth, blood, and saliva should be cleared from the mouth, and the tongue may be controlled by a dorsal suture. An oropharyngeal airway may be required. The maxillofacial team should be involved early on for treatment planning.

Intubation may be necessary in a patient with substantial head injury, and the inability to intubate may necessitate surgical cricothyroidotomy because nasotracheal intubation is contraindicated.

The diagnosis of fracture is from the history, pain, swelling, bruising (hematoma), bleeding (usually intraorally), mobility of fragments (and crepitus), deranged occlusion, paresthesia or anesthesia of nerves involved, and radiographic signs.

Mandibular fractures

Mandibular fractures are commonly due to assault and are usually simple and not associated with other serious injuries or bleeding (figure 7). If the symphysis is comminuted, the tongue could fall back and obstruct the airway, and this must be prevented. Simple undisplaced fractures may occasionally be treated conservatively with a soft diet if the teeth are not damaged. If the fragments are excessively mobile, pain will be substantial, and early fixation is the best management. Most fractures are managed by open reduction and internal fixation, usually with miniplates.

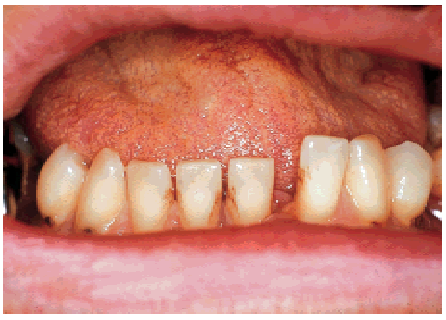

Figure 7 Step deformity of occlusion revealing mandibular fracture

Middle third or upper facial skeleton fractures

Fractures of the middle third or upper facial skeleton commonly arise from severe trauma (particularly motor-vehicle accidents) and are classified into Le Fort fracture lines (figure 8):

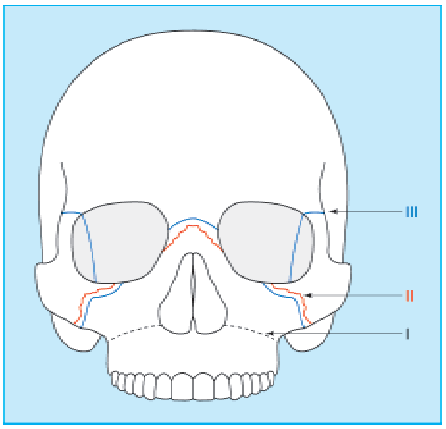

Figure 8 Le Fort lines of middle third facial fractures (redrawn from Scully et al *Oxford Handbook of Dental Patient Care.* Oxford University Press, 1998)

- I: low level above the nasal floor (swelling of upper lip)
- II: subzygomatic (massive swelling of face: ballooning) (Panda facies)
- III: suprazygomatic (massive swelling of face and cerebrospinal rhinorrhea)

There may be airway obstruction, head injury, chest injuries, ruptured viscera, and fractured spine and long bones. Most middle third fractures are treated by open reduction and internal fixation with miniplates.

Zygomatic (malar) fractures

Zygomatic fractures are typically due to assaults. Orbital features are common and include depression of the cheek, lateral subconjunctival hemorrhage, rim-step deformities, restricted eye movements, changes in visual acuity, variation in pupil size and reactivity, and occasionally, enophthalmos or exophthalmos.

Undisplaced uncomplicated fractures need no treatment but should be reviewed as early as possible within 2 weeks. For others, reduction is by elevating from the temporal region (Gillies approach), an intraoral approach, or open reduction and internal fixation.

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Further reading

Andreasen JO, Andreasen FM. *Textbook and Colour Atlas of Traumatic Injuries to the Teeth.* Copenhagen: Munksgaard; 1994.

Bishop BG, Donnelly JC. Proposed criteria for classifying potential dental emergencies in Department of Defence military personnel. *Mil Med* 1997;162:130-135.

Gilthorpe MS, Wilson RC, Moles DR, Bedi R. Variations in admissions to hospital for head injury and assault to the head, part 1: age and gender. *Br J Oral Maxillofac Surg* 1999;37:294-300.

Moles DR, Gilthorpe MS, Wilson RC, Bedi R. Variations in admission to hospital for head injury and assault to the head, part 2: ethnic group. *Br J Oral Maxillofac Surg* 1999;37:301-308.

Muthukrishnan A, Walters H, Douglas PS. An audit of antibiotic prescribing by general practitioners in the initial management of acute dental infection. *Dent Update* 1996;23:316-318.

Nelson LP, Shusterman S. Emergency management of oral trauma in children. *Curr Opin Pediatr* 1997;9:242-245.

Roberts G, Longhurst P. *Oral and Dental Trauma in Children and Adolescents.* Oxford, UK: Oxford University Press; 1996.

Sheller B, Williams BJ, Lombardi SM. Diagnosis and treatment of dental caries-related emergencies in a children's hospital. *Pediatr Dent* 1997;19:470-475.